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Lee

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/604,891

08/25/2003

Takuji TANAKA

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38834

7590

04/13/2006

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EXAMINER

LEE, EUGENE

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 04/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/604,891

Applicant(s)

TANAKA, TAKUJI

Examiner

Eugene Lee

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 13-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasai 5,821,594 in view of Wu 6,180,988 B1. Kasai discloses (see, for example, FIG. 4) a semiconductor device comprising a gate oxide layer (gate insulation film) 53, gate electrode 54, n+- diffusion layer (source, drain) 58, silicon oxide layer (low permittivity region) 59, silicon oxide layer (first film) 55, and etch stop layer (second film) 56. Kasai does not disclose said low permittivity region being made of a lower permittivity material as compared to said sidewall film. However, Wu discloses (see, for example, FIG. 8) a semiconductor device comprising air gaps (low permittivity region) 22. In column 4, lines 26-27, Wu discloses the air gaps reduce the effect of gate fringe capacitance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have said low permittivity region being made of a lower permittivity material as compared to said sidewall film in order to reduce the effect of gate fringe capacitance.

Regarding claim 13, see, for example, FIG. 4 wherein Kasai discloses an etch stop layer (third film) 56.

Art Unit: 2815

3. Claims 14 thru 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasai '594 in view of Wu '988 B1 as applied to claims 1, and 13 above, and further in view of Lee 6,251,737 B1. Kasai in view of Wu does not disclose a part of a side wall lower portion of said gate is removed to have said low permittivity region formed into a notched shape. However, Lee discloses (see, for example, FIG. 1H) a MOS transistor comprising a gate polysilicon layer 116, and air spacers 136. The air spacers are formed in a notch underneath the gate polysilicon layer. In column 5, lines 60-66, Lee discloses that signal transmission delay is reduced, and the operating speed of the device is increased. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have a part of a side wall lower portion of said gate is removed to have said low permittivity region formed into a notched shape in order to reduce signal transmission delay, and increase operating speed.

Response to Arguments

4. Applicant's arguments filed 1/30/06 have been fully considered but they are not persuasive.

Regarding the applicant's argument on page 6 of the amendment filed 1/30/06 that the mere fact that references may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification, this argument is not persuasive. It must be recognized that any judgment on obviousness is in any sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the invention was made, and does not include knowledge gleaned only from the Applicant's

Art Unit: 2815

disclosure, such a reconstruction is proper. In re McLaughlin, 443 F. 2d 1392; 170 USPQ 209 (CCPA 1971). In this case, Wu gives a clear motivation (see, for example, column 4, lines 26, 27) to use air gaps for a MOSFET. Such an air gap, when included in the embodiment of Kasai, would provide a clear separation between the gate electrode and the substrate 51, and thereby reduce fringe capacitance to a greater extent than would a material. Also, the reduction of fringe capacitance would occur in an area (i.e. between the gate electrode and substrate) where fringe capacitance would be most prevalent (see paragraph [0014] of applicant's specification), further justifying the appropriateness of the combination.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee
April 6, 2006



EUGENE LEE
PRIMARY EXAMINER